OPERATIVE TREATMENT OF CORROSIVE ESOPHAGEAL STRICTURES

OPERACYJNE LECZENIE POOPARZENIOWYCH ZWĘŻEŃ PRZEŁYKU

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ABSRTACT

Introduction: Nowadays operative treatment of corrosive esophageal strictures remains one of the difficult and unsolved problems in surgery. The level of postoperative complications such as anastomotic leak (develops in 7-30% of cases), infections, pneumonia, pleural empyema, mediastinitis, peritonitis, postoperative corrosive strictures is still rather high.

The aim of our work was to improve the results of surgical treatment of patients with corrosive esophageal strictures by analyzing and refining on conservative therapy options as well as differentiated approach to each operative treatment method.

Materials and methods: 44 patients with corrosive esophageal strictures operatively treated during the period of 1993-2017 were examined. Indications for each of esophagoplasty techniques were established. In colon bypass of the esophagus (26 patients) infusion therapy for prevention of ischemic transplant disorders, roentgenologic and prevascular preparation of future colonic transplant, anti-reflux colonogastric anastomosis were suggested. In gastric esophagoplasty (10 patients), clinically modified transhiatal extirpation of the esophagus with gastric tube plastics, an original method of lengthening of gastric graft, is preferred in clinical practice. Two patients underwent ileocecal segment esophagoplasty because of simultaneous esophageal and gastric lesion or colon diseases.

Results: The best method of esophagoplasty associated with a small number of postoperative complications is clinically modified gastric tube esophagoplasty with formation of single extrapleural esophagogastric anastomosis. In cases when the stomach cannot be used and the marginal artery is well marked, isoperistaltic retrosternal colonoplasty with preservation of blood supply due to the left colonic artery is indicated. Suggested method of ileocecal segment esophagoplasty is used in simultaneous esophageal and gastric lesion, providing the formation of relevant reservoir (the cecum instead of the stomach), antireflux mechanism and preventing the development of peptic ulcers and transplant strictures.

Conclusions: Operative treatment of corrosive esophageal strictures remains a great challenge for surgeons and should be based on individual choice of proper method of esophagoplasty and final intraoperative decision making.

KEY WORDS: corrosive strictures, stomach, colon, ileocecal segment

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INTRODUCTION

Nowadays operative treatment of corrosive esophageal strictures is still one of the difficult and unsolved problems in surgery. Esophageal strictures most often develop after esophagus burns, radiation therapy, esophageal varices sclerosis, mycosis, infectious diseases, collagen disease etc., peptic strictures – after reflux-esophagitis, corrosive strictures – after the surgery [1, 2, 3, 4]. There is a great variety of treatment methods of corrosive esophageal strictures both conservative (gullet bougienage, various types of dilation) and operative, but today there is no common view as to the most optimal of them. It refers first of all to the choice of esophagoplasty technique, specifically the choice of transplant for gullet plastics, surgical approach, placement, types and methods of esophago-organ anastomosis formation, prevention and treatment of complications such as anastomotic leak occurring in 7-30 % cases, development of infections, pneumonia, pleural empyema, mediastinitis, peritonitis and postoperative corrosive strictures. Besides, postoperative mortality rate remains rather high – 3.5-30% [5, 6, 7, 8, 9].

THE AIM

The aim of our work was to improve the results of surgical treatment of patients with corrosive esophageal strictures by analyzing and refining on conservative therapy options as well as differentiated approach to each operative treatment method.

MATERIALS AND METHODS

44 patients with corrosive esophageal strictures operatively treated at surgery clinic № 1 of Vinnytsya National Pirogov Memorial Medical University and the Department of eosophagus and gastro-intestinal tract surgery of state institution "Institute of General and Emergency Surgery of National Academy of Medical Sciences named after V.T.Zaitsev" during the period of 1993-2017 were examined. The age of the patients ranged from 18 to 82 years. The great majority of patients were individuals of 30-59 years.

There were 38 patients with post-burn gullet strictures, 3 - with postoperative corrosive strictures, 5 – with peptic strictures after reflux-esophagitis. Among the patients with post-burn

Table I. Pathologic states and reconstructive operations performed in patients with constrictive diseases of the esophagus

Pathology	Surgery	Number of operations
Post-burn corrosive strictures	Colon patch esophagoplasty (ascending, transverse, descending)	5
	Colon patch esophagoplasty by Montenegro	4
	Retrosternal plastics with the right half of colon	13
	Intrapleural esophagoplasty with the colon	3
	Removal of colon patch with formation of gastrocolonic anastomosis	1
	Intrapleural esophagoplasty with the stomach	1
	Resection of the esophagus with plastics by Lewis	6
	Gottstein's operation	2
	Clinically modified gastric tube esophagoplasty	1
	Plastics with ileocecal segment	2
Postoperative corrosive strictures	Reconstruction of esophagogastric anastomosis	1
	Plastics by Heller-Dorr	2
Strictures after reflux-esophagitis	Resection of the middle and lower third of the esophagus, esophagogastric anastomosis	1
	Clinically modified gastric tube esophagoplasty	1
	Plastics by Heller-Dorr	3

gullet strictures the causes of the burns were: accidental ingestion of strong alkaline solution – in 18, electrolytic (battery) solution – in 6, concentrated acids (nitric, acetic, hydrochloric, sulfuric, orthophosphoric and others) – in 9, unknown liquid – in 5 patients. Two of three patients with postoperative corrosive strictures had been previously operated for ring stricture of the lower third of the esophagus, and one patient had undergone gastric tube esophagoplasty followed by the development of esophagogastric anastomosis stricture.

Distribution by sex showed the prevalence of males (74.5 %). All the patients underwent comprehensive clinical and laboratory examination. Instrumental methods (ultrasound and spiral computed tomography) were used with mandatory study of barium passage to determine esophageal obstruction degree.

In order to prevent ischemic disorders and improve colonic transplant nutrition as well as to prevent postoperative complications, the patients assigned to undergo esophagoplasty received the suggested preoperative (a day before scheduled operation), intraoperative and postoperative infusion therapy which included intravenous administration of 4 ml of 5% mexidol in 200 ml of saline solution two times a day, 100 ml of tivortin once a day, intravenous slow infusion of 1 ml of 1% nicotinic acid solution two times a day (*useful model patent of Ukraine № 78205 of 11.03.2013 "The method of prevention of colonic transplant ischemia in esophagoplasty"*).

RESULTS AND DISCUSSION

All 48 abovementioned patients underwent reconstructive operations listed in the table (table I).

Colon patch esophagoplasty was performed in 26 patients. It was carried out predominantly for post-burn corrosive strictures in high stricture localization as well as in cases when the stomach could not be used as a transplant because of the burn, oncologic lesion or inappropriately formed gastric fistula. The most preferable method of esophagoplasty in clinical practice is isoperistaltic retrosternal plastics with colon segment consisting partially of ascending, transverse and descending colon with preservation of blood supply due to the left colic artery. In order to study the angioarchitectonics of the colon we performed angiography and occlusion of supplying vessels preserving the major blood supplying arcade for the development of collaterals in it (*patent of Ukraine on invention №103847 of 25.11.2013 "The method of colonic transplant preparation for esophagoplasty"*). In 20-30 days after the adaptation of colonic transplant to colonoplasty the main stage of operation was performed - colon patch esophagoplasty with simultaneous formation of anti-reflux anastomosis between the lower end of transplant and anterior antral wall by the clinic's method (*patent of Ukraine on invention №103862 of 25.11.2013 "The method of antireflux colonogastric anastomosis formation"*). In postoperative period the patients received enteral feeding with high-caloric formula through nasogastric tube or gastric fistula as well as the administered infusion, antibacterial and anti-inflammatory therapy. On the 8-10th day assessment of anastomoses was done by X-ray examination after oral administration of water soluble contrast agent. After that the patients were allowed to take first liquid and then solid food by mouth. The following postoperative complications developed: esophagocoloanastomotic leak (1), partial esophagocoloanastomotic leak (2), in late postoperative period – stricture formation. Partial anastomotic leaks were managed conservatively. Esophageal strictures were treated conservatively by bougie dilation. Three patients died after retrosternal plastics with the right half of the colon: one from acute cardiovascular insufficiency, one as a result of esophagocoloanastomotic leak with subsequent development of pleural empyema and mediastinitis and one because of bleeding.

Esophagoplasty with the stomach was performed in 10 patients: in 8 patients – after post-burn strictures and in 2 – for peptic strictures after reflux-esophagitis. In clinical practice the most preferable method is transhiatal extirpation of the esophagus with clinically modified gastric tube esophagoplasty, an original method of gastric transplant lengthening (*useful model patent of Ukraine № 85680 of 25.11.2013 "The method of gastric transplant lengthening"*). Transplant formed from the stomach (gastric tube) has a number of advantages: affinity of

esophageal remnant tissues and the stomach; good blood supply provided by the right gastro-cranial artery; need for placing one cervical anastomosis (but not three) with no severe pulmonary complications in case of its leak; less extent of the operation and its better tolerance by the patients. The major complication after esophagoplasty with the stomach was partial esophagocoloanastomotic leak after Lewis operation in 5 patients and after gastric tube esophagoplasty in 2. There were no lethal cases.

However, there are instances when the above mentioned esophagoplasty methods as those with the colon and the stomach cannot be performed. This occurs in simultaneous lesion of the esophagus and the stomach (as in burns) or in colon diseases (malignant invasion to the corresponding portion of the colon, its necrosis), as well as in poorly marked marginal artery. Besides, those types of esophagoplasty have a number of disadvantages: absence of appropriate reservoir, anti-reflux mechanism (cardia performs its function), leading to peptic ulcer formation with subsequent development of transplant strictures. Because of those reasons 2 patients underwent esophagoplasty with ileocecal segment preserving the blood supply due to iliocolic artery and vein *(useful model patent of Ukraine № 78206 of 11.03.2013 "The method of gastroplasty with ileocecal segment")*. This type of plastics was chosen for them because of combined burn injury of the esophagus and the stomach and inability to use colonic segment because of poorly marked marginal artery. The suggested method of esophagoplasty with tube ileocecal segment has the following advantages: it takes into account individual characteristics of the patients when esophagoplasty with the stomach is impossible; adequate conditions for transplant blood supply; the possibility to lengthen the transplant to required sizes; preservation of anti-reflux mechanism due to ileocecal valve with less risk of reflux and inevitable development of peptic esophagitis, peptic ulcers and colonic transplant strictures; preservation of reservoir function of the artificial stomach (in new conditions it is the cecum that fulfills its function). The following postoperative complications occurred: partial leak of esophagoileoanastomosis in one patient which was managed conservatively. No late postoperative anastomotic strictures were noted.

CONCLUSIONS

1. Operative treatment of corrosive esophageal strictures remains a great challenge for surgeons and should be based on individual choice of proper method of esophagoplasty and final intraoperative decision making.
2. The patients assigned to scheduled esophagoplasty should undergo complete and comprehensive laboratory and instrumental investigation including 3-D computed tomography and angiography.
3. The best mode of esophagoplasty with less number of postoperative complications is considered to be clinically modified plastics with the stomach by Chernousov with formation of single extrapleural esophagogastric anastomosis. In cases when the stomach cannot be used but the marginal artery is well marked isoperistaltic retrosternal colonoplasty is indicated with blood supply preservation due to the left colic artery.
4. The suggested method of esophagoplasty with ileocecal segment is used in simultaneous lesion of the esophagus and the stomach, providing the formation of appropriate reservoir (the cecum instead of the stomach), antireflux mechanism which enables to avoid the development of peptic ulcers and transplant strictures.

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